

Isolation and characterization of phytotoxins secreted by *Phytophthora ramorum*

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Most *Phytophthora spp.* secrete a variety of small hydrophilic proteins that induce a hypersensitive-like response to varying degrees in host and non-host plant species. Our research is focusing on the potential role of these proteins in the biology and susceptibility of host species to Sudden Oak Death. Here, we report on the purification and characterization of several proteins from the culture filtrates of *P. ramorum* media. Exposure of leaf discs from several host species (*Umbellularia californica* and *Rhododendron spp.*) to semi-purified protein fractions results in altered membrane integrity and alkalinization of a bathing solution. Such physiological changes are consistent with the hypersensitive-like response shown in other *Phytophthora spp.*, and appear to develop prior to any visual symptoms (e.g., wilting and/or necrosis). We have also conducted preliminary studies exploring leaf physiological responses distal to *P. ramorum* infection zones (i.e. stem inoculations). Similar to the protein assays, changes in membrane integrity and function may be observed in uninfected, non-symptomatic leaf tissues. The potential role of these phytotoxins in the development and impact of Sudden Oak Death will also be discussed.